

## EDUCATIONAL OPPORTUNITIES FOR A "GREEN WORKFORCE"

The PHEV project is a learning tool. Students in the Maui High School automotive program participated in the conversion. Work was done in the school's shop and students were able to observe and assist, providing the young technicians invaluable knowledge in the emerging field of electric vehicle propulsion. The Mayor's vision for Maui's renewable energy future involves the development of these kinds of skills to prepare a workforce for the new opportunities to come. This is their future.



Mayor Charmaine Tavares looks over the installed battery in the trunk compartment of the Toyota Prius.



### Maui County PHEV (Plug-in Hybrid Electric Vehicle) Test Car

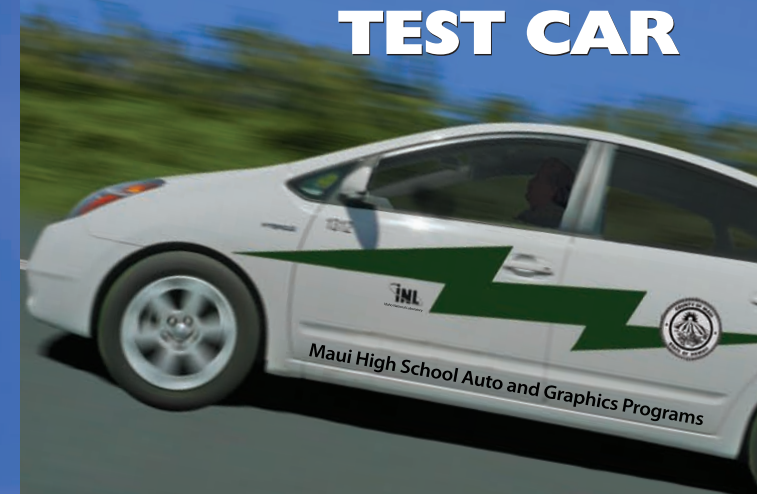
Sponsor:	Idaho National Laboratory Advanced Vehicle Testing Activity (AVTA) Program U.S. Department of Energy
Maui County Vehicle:	2007 Toyota Prius
Conversion Kit::	Hymotion L5 Plug-in Conversion Module, A123 Systems, Inc.
Battery Weight:	187 lbs.
Energy Storage:	5 kWh (kilowatt-hour)
Charging Voltage:	110 Volts
Max Charging Current:	10 Amps
Charging Time:	5.5 Hours @ 75 deg F
Data Logger:	V2Green Technology, GridPoint, Inc.
Study Duration:	12 Months

## Maui County Moves Towards Renewable Energy



The County of Maui is a participant in testing converted plug-in hybrid electric vehicles (PHEVs) sponsored by the Idaho National Laboratory (INL) and the U.S. Department of Energy's (DOE) Advanced Vehicle Testing Activity (AVTA) program. The purpose of the nationwide program is to study the field performance of advanced technology vehicles. By providing one of the test sites, Maui County gains first-hand knowledge in the latest advances in automotive technology and data automation.

### Maui County Plug-in Hybrid Electric Vehicle **PHEV** **TEST CAR**





# Laying the foundation for a sustainable future

## PLUG-IN HYBRID ELECTRIC VEHICLES (PHEV)

Mayor Charmaine Tavares has made renewable energy one of her top issues and this test program is in line with her goals of sustainability. The Mayor hopes that more of these types of technologies will come to Maui and her vision for Maui's renewable energy future involves the development of a skilled, "green workforce."

## Making renewable energy a top priority

### THE TEST PROGRAM

The Maui County-owned Toyota Prius is one of 130 vehicles in the national study. The conversion was accomplished by installing an L5 PCM (Plug-in Conversion Module) supplemental lithium ion battery system from Hymotion™. This onboard electrical storage system works by powering the Prius with pure electric drive until it becomes depleted, achieving fuel efficiency in excess of 100 mpg. Since the conversion is an add-on capability, the supplemental battery is charged (plugged-in) separately from the regenerative charging system built-in to the regular Prius. Additionally, the plug-in capability of the added module enables the Prius to truly store energy from alternative sources when available. This feature demonstrates the potential of pure electric vehicles (EV) in our future. The funding and technical support is provided at no cost to the County. The testing program gathers data on the performance of Maui's car remotely, wirelessly and interruption-free, without interfering with the normal use and function of the county vehicle.

### A CLEANER ENERGY FUTURE – PHEV

- Energy efficient transportation
- Lessens dependency on fossil fuels
- Dramatically decreases gas usage
- Cuts carbon emissions to nearly zero
- Travels up to 35 miles with a single charge
- Charges from any standard household outlet
- Installs with minimal modification to the car
- Provides educational opportunities for "green" jobs
- Opens up potential for new battery storage technology for renewable energy



### THE CAR

The standard gas-electric Prius hybrid system includes a nickel-metal-hydrate battery which remains intact in the county's PHEV. Based on the fact that a large number of commuters drive fewer than 30 miles per day round trip, the system is sized to add an additional 5kWh (kilowatt-hour) of stored electrical capacity. When fully charged (approximately 6 hours), the additional battery allows the converted vehicle to travel with electric assistance for the first 30-40 miles. It can boost the car's performance to 60-70 mpg. The difference is significant when compared to the standard, unmodified Prius which gets approximately 40-45 mpg. Plug-in hybrids can run on electricity more of the time than conventional hybrids, so they use significantly less gasoline especially at lower speeds. They use a higher proportion of gas when traveling at higher speeds. When the charge depletes, the vehicle reverts to gas-electric hybrid function. It can be charged with a standard 120-volt outlet.

### ENERGY STORAGE TECHNOLOGY

The County of Maui supports the federal government's electric vehicle program, because of the potential of these batteries for storing great amounts of electrical energy when combined in large numbers. Energy storage is one of the greatest challenges to capturing and supplying abundant, renewable energy in a way that is readily available and easy to use. Most forms of renewable energy are variable and need to be stabilized to a constant, continuous supply (firm energy) to be useable as a reliable source of power. Cars that are powered by electricity from alternative sources are clean and carbon-free.



This Toyota Prius features a Hymotion L5 conversion kit sold by A123 Systems. Module Weight is 187 Pounds

